AMENDMENTS TO THE SPECIFICATION

BSH 8/17/07

Please amend the paragraph beginning on line 10 and ending on line 24 of page 14 of the Specification as follows:

According to another important aspect of the present invention, the measured changes in optical properties are correlated to concentrations of hydrogen and then used to quantify the volume of diffusible hydrogen in a particular sampled mass. In general, the measuring apparatus 10 is calibrated to first correlate a detected optical change (visible as a color change) in the sensing layer 28 to a concentration (ppm) of hydrogen in the sample volume. As illustrated in Figure 3, a linear sensor response or correlation was found for a WO_3 sensing layer 28 with a palladium layer 30 between the increase in hydrogen concentration and decrease in reflectance intensity, i.e., signal drop in nanowatts. The linear correlation of Figure 3 was developed by exposing a WO_3 sensing layer 28 and a reflector layer 30 to known quantities of hydrogen in a controlled atmosphere, i.e., synthetic air of 80% nitrogen and 20% oxygen, having a volume of approximately 0.5 liters. The sensing and reflector layers 28 and 30 were allowed to react for fifteen minutes with each hydrogen concentration (ppm), and a reflectometer was used to measure the signal drop. The response of the sensing layer 28 was found to be linear over a wide range of hydrogen concentrations, and specifically, a linear response was found when hydrogen concentrations ranged from 200 to 1000 ppm in the controlled volume. The calibration data was then converted to volumes of hydrogen (μliters) and then adjusted for the differences in calibration volume (0.5 liters, as discussed above) and sample volumes 18 of the sensor assembly 20 by multiplying the volume of hydrogen by the ratio of the sensor volume 18 to that of the calibration volume. This adjusted volume was then plotted (not shown) as a function of sensor response, i.e., signal drop, to correlate the volume of diffusible hydrogen to the signal drop detected in the sensor 28, a curve with a slope with units of μliter/nW. Significantly, the slope of this curve provides a standard conversion factor that can be applied to each sensor assembly response curve acquired from a weld material to determine a rate of diffusivity from the weld material, i.e., in units of μliter/minute,